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Improving Quality of Care for Hospitalized Smokers with HIV: Tobacco Dependence Treatment Referral and Utilization

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Article-at-a-Glance

Background—Most persons living with HIV smoke cigarettes and tend to be highly dependent, heavy smokers. Few such persons receive tobacco treatment, and many die from tobacco-related illness. Although advancements in antiretroviral therapy (ART) have increased the quality and quantity of life, the health harms from tobacco use diminish these gains. Without cessation assistance, thousands will benefit from costly ART, only to suffer the consequences of tobacco-related disease and death. A study was conducted to examine in detail inpatient tobacco treatment for smokers with HIV.

Methods—Data collected at hospital admission and data collected by tobacco treatment specialists were examined retrospectively for all inpatients with HIV who were admitted to an

academic medical center for a five-year period. Specifically, the prevalence of cigarette smoking, factors predictive of referral to tobacco treatment, referral for tobacco treatment, treatment participation, and abstinence at six months post-treatment were measured. Differences in referral and treatment participation between all smokers and smokers with HIV were also assessed.

Results—Among the 422 admitted persons with HIV, 54.5% smoked and 21.7% were referred to inpatient tobacco treatment services. Substance abuse and tobacco-related diagnoses were predictive of referral to inpatient tobacco treatment specialists. Among the 14 treatment participants reached for follow-up, 11 (78.6%) made quit attempts and 3 (21.4%) reported abstinence. Smokers with HIV were less likely to be referred to and treated by tobacco treatment services than all smokers admitted during the same time frame.

Conclusions—Although tobacco is a major cause of mortality, few smokers with HIV are offered treatment during hospitalization. Those who are treated attempt to quit. Hospitalization offers a prime opportunity for initiating smoking cessation among those with HIV.

Smoking prevalence among people with HIV in the United States is estimated to be between 50% and 70%—two to three times the prevalence in the general population.^{1–3} Moreover, smokers with HIV tend to be more highly dependent, heavier smokers.^{1,4,5} Despite knowledge that smoking causes physical harm, smokers with HIV continue to smoke, presumably to alleviate the social, economic, psychiatric, and medical stressors associated with living with HIV.^{6,7}

Tobacco-related illnesses among people with HIV have begun to cut into the length and quality of life gained through advancements in antiretroviral therapy (ART).^{8–10} The increased risk of cardiovascular disease of HIV+ patients on ART could very well exacerbate comorbid tobacco-related illnesses.^{11–13} Furthermore, smokers with HIV are less likely to adhere to their HIV treatment plan, have a greater likelihood of developing an AIDS-defining condition, and die earlier than nonsmokers with HIV.^{14,15} Many smokers with HIV are interested in smoking cessation treatment, have made quit attempts, and can successfully quit.^{1,4,6,9,16} Those who quit smoking report decreases in HIV-related symptoms and improvements in quality of life.¹⁴

Tobacco treatment during hospitalization, with outpatient follow-up for at least one month, helps smokers quit.^{17–19} Persons living with HIV are often hospitalized because of the nature of their illness,²⁰ providing an opportunity to introduce tobacco treatment into their treatment regimen. Without cessation assistance, thousands will benefit from costly ART, only to suffer the consequences of tobacco-related disease and death.^{7,21}

This study examined the prevalence of smoking, referral to treatment, receipt of treatment, and treatment outcomes among people living with HIV admitted to a large academic medical center hospital with an established inpatient tobacco treatment program.

Methods

Overview

We identified all patients with HIV admitted to the University of Kansas Hospital (Kansas City) from September 1, 2007, through August 31, 2012. For these patients, we calculated the prevalence of smoking and identified all patients referred to inpatient tobacco dependence treatment. We identified factors predictive of referral to tobacco dependence treatment, described inpatient treatment, and report six-month outcomes. This study was approved by the medical center's Institutional Review Board. The study spanned five years, beginning immediately after the adoption of the hospital electronic health record (EHR) and ending before the onset of a smoking cessation study that targeted HIV+ smokers.

Setting

The University of Kansas Hospital is a 550-bed academic medical center with a bedside tobacco treatment service, the University of Kansas Hospital Patient Tobacco Cessation Program (UKanQuit), as previously described in detail.^{22–24} Patients can be referred to this service by a physician order or may request it. UKanQuit treatment includes inpatient bedside counseling, fax referral to the state tobacco quitline for treatment after discharge, and evidence-based recommendations for inpatient and postdischarge smoking cessation medication(s). UKanQuit services are available to all smokers, regardless of their current motivation to quit. Counselors assess readiness to quit and then provide motivational interviewing at the bedside. UKanQuit makes three to six attempts to contact patients by phone at six months after discharge to assess outcomes. At the time of this study, patients were contacted six months after discharge. To align with national performance measure definitions introduced by The Joint Commission, effective with January 1, 2012, discharges, patients were then contacted one month post-discharge for follow-up.^{25*}

Participants

All encounters with patients admitted to the hospital with an HIV-related International Classification of Diseases, Ninth Revision (ICD-9) code for HIV disease or HIV-related illnesses in the problem list or medical history sections of their EHR were eligible to be included in analyses. For patients with multiple encounters during the five-year time frame, data from the first encounter were selected for analysis. Smoking status was missing for 2.4% of patients, who were omitted from the analysis.

Measures

Study measures consisted of data from the hospital EHR, intake data from the UKanQuit treatment service, and follow-up data collected by UKanQuit six months following discharge. EHR data, which were collected from all patients admitted to the hospital with HIV, were as follows: age, gender, race/ethnicity, marital status, primary language, insurance coverage, smoking status (smoked in the past year/30 days), smoking history (years smoked,

*TOB-4, Tobacco Use: Assessing Status After Discharge, requires a follow-up call to the patient during the 30 days after discharge to assess tobacco use status, adherence to cessation medication, and continued participation in counseling. TOB-4 has been temporarily suspended since January 1, 2015, because of feasibility of data collection.

packs per day smoked, living with other smokers), admission service, admission unit, admission through the emergency department, length of stay, discharge diagnoses (cardiac and pulmonary versus *other*), HIV severity (viral load, nadir CD4 count, and most recent CD4 count), and risk behaviors (alcohol use, substance abuse).

UKanQuit intake data were collected from all patients served. Intake data included referral source (physician order, patient/nurse request), interest in quitting (0–10 scale, with 10 representing high interest), current use of in-hospital quit-tobacco medication, interest in starting or changing in-hospital quit-tobacco medications, interest in using quit-tobacco medication after discharge, set quit plan (y/n), and set short-term goals related to their smoking.

UKanQuit six-month follow-up data assessment consisted of the following:

- Current smoking status (seven-day point prevalence of abstinence)
- Number of postdischarge quit attempts
- Quit-tobacco services used postdischarge
- Importance of quitting/staying quit (0 to 10 scale, with 10 representing high importance)
- Confidence in ability to quit/stay quit (0 to 10 scale, with 10 representing high confidence),
- Satisfaction with UKanQuit services (0 to 10 scale, with 10 representing high satisfaction).

Data Analysis

Study Population and Prevalence of Smoking—Patient characteristics and the prevalence of smokers were summarized using descriptive statistics. Categorical variables were summarized using frequencies, and continuous variables were summarized with means and standard deviations. All analyses were conducted using IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, New York).

Referral to UKanQuit—Predictors of referral to UKanQuit were analyzed using regression analyses, with all variables collected from the EHR as potential associated factors—age, gender, race, marital status, language, insurance coverage, smoking status, years smoked, packs smoked per day, living with other smokers, admission service, admission unit, admission through the emergency department, length of stay, discharge diagnoses (tobacco-related or not), viral load, nadir CD4 count, most recent CD4 count, alcohol use, and substance abuse.

To reduce the number of potential associated factors in the model, the effects of each individual factor were explored using simple logistic regression. Factors with a p value < 0.25 were entered into a multiple logistic regression model, which was built by stepwise procedure.

UKanQuit Treatment and Follow-Up—Data from inpatient treatment and follow-up by UKanQuit were summarized using descriptive statistics. Categorical variables were summarized using frequencies and percentages, and continuous variables were summarized with means and standard deviations. A *t*-test was used to compare demographic variables for those completing a six-month follow-up to those not completing the follow-up.

Differences in Referral and Treatment for All Smokers and Smokers with HIV—Chi-square analyses were completed to compare referral and utilization rates of smoking treatment services by smokers with HIV to all smokers during the same time frame.

Results

Study Population And Prevalence OF Smoking

During the five-year time frame, a total of 422 patients with a diagnosis of HIV were admitted to our institution. Of these, 54.5% were current smokers (Figure 1, right). The majority of these patients were male (75.4%), white (54.0%), and single (73.2%), and 28.9% had private insurance. Their mean age was 43.7 years (standard deviation [SD], 11.45).

Referral to UKanQuit

Of the 230 smokers, 50 (21.7%) were referred to UKanQuit. Those with a tobacco-related primary discharge diagnosis and those without an indication of substance abuse in their chart were more likely to be referred to UKanQuit (odds ratio [OR] 2.92, 95% confidence interval [CI] = 1.39, 6.17, $p = 0.005$; OR 2.59, 95% CI = 1.14, 6.47, $p = 0.041$, respectively). The multivariate model built using seven variables with a p value < 0.25 from simple logistic regression (age, race, cigarette packs smoked per day, substance abuse, viral load, most recent CD4 count, and tobacco-related diagnosis) found no factors remaining significantly associated with referral to treatment.

UKanQuit Treatment

Of the 50 patients referred to UKanQuit, 43 (86.0%) were treated (Table 1, page 222). UKanQuit staff attempted to see all 50 patients; however, 6 patients were discharged before staff could reach them, and 1 patient was quarantined.

Patients reported a high average interest in quitting (mean = 7.5, SD, 3.32), yet few patients were ready to set a quit date ($n = 8$, 18.6%). Seven patients (16.3%) were currently using in-hospital quit-tobacco medication (such as the nicotine patch). UKanQuit counselors made recommendations to start or change in-hospital quit-tobacco medications for 8 patients. Four patients (9.3%) expressed interest in using quit-tobacco medication after discharge. Thirteen (32.5%) of 40 patients accepted fax referral to the state tobacco quitline (Table 1).

Differences in Referral and Treatment Between All Smokers and Smokers with HIV

During the same time frame, smokers with HIV were less likely to be referred to and treated by UKanQuit than all smokers. Of all smokers, 29.8% were referred to UKanQuit, while only 21.7% of smokers with HIV were referred ($p < 0.01$). Of all smokers, 24.7% were treated by UKanQuit, while only 18.7% of smokers with HIV were treated ($p = 0.04$; Figure

2, page 223). However, among those referred, the percentage of all referred smokers who received treatment (82.8%) did not significantly differ from referred smokers with HIV treated (86.0%; $p = 0.55$).

Follow-Up at Six Months Postdischarge

At 6 months postdischarge, UKanQuit was able to contact about one third of the patients seen ($n = 14$) (Table 1). Reasons for loss to follow-up included 14 patients (32.6%) who had a wrong or disconnected number, 9 (20.9%) who could not be reached after six attempts, 5 (11.6%) who refused to speak to UKanQuit staff, and 1 patient who had died. There were no statistically significant differences in sociodemographic characteristics between those who were available for follow-up and those who were not.

The self-reported seven-day point prevalence abstinence rate was 21.4% (3 of 14). Assuming that all participants not reached were smokers, the intent-to-treat abstinence rate at six months was 7.0% (3 of 43). Eleven patients (78.6%) reported they had made at least one quit attempt. The mean length of time that patients went without smoking during these quit attempts was 31.9 days (SD, 63.34). No patients reported using the state tobacco quitline. Five (35.7%) reported using pharmacotherapy (nicotine patch, varenicline) to help them quit. Mean importance to quit smoking (or stay quit for those no longer smoking) was 8.1 (SD, 3.21). Mean confidence in quitting (or staying quit) was 5.9 (SD, 3.35). Patients were satisfied with UKanQuit services; when asked if the program should continue to be provided, 13 (92.9%) said yes, and they rated their satisfaction with services received an average of 8.9 (SD 1.61).

Discussion

More than half of a total of 422 hospitalized patients with HIV admitted to the University of Kansas Hospital from September 1, 2007, through August 31, 2012, smoked cigarettes, but only 1 in 5 were referred for tobacco treatment. Of these, nearly all received treatment, and a third accepted referral to the state tobacco quitline. Among those who could be reached at six months, most had made at least one quit attempt and 1 in 5 reported they had quit, yielding an intent-to-treat quit rate of 7.0%. None had used quitline services, but a third reported they used cessation medication to try to quit.

Consistent with past findings, the prevalence of smoking among inpatients with HIV in this study was much higher than that of the general population.^{7,22,23} Also consistent with other findings was the quit rate. Recent studies have found quit rates ranging from 6% to 30% with behavioral interventions similar to the UKanQuit tobacco treatment service.²⁶

These data open several potential directions for research and practice. There seems to be a bias against referring patients with substance abuse histories to tobacco treatment. This bias continues in spite of numerous studies finding that smoking cessation does not harm, and very likely improves, drug treatment outcomes.^{27–29} To increase the number of HIV+ smokers offered tobacco treatment, infectious disease clinicians, Ryan White case managers, and others focused on treating HIV should adopt a policy of providing tobacco treatment or referring all HIV+ inpatient smokers to tobacco treatment and working out a special plan for

those receiving treatment for both tobacco dependence and other substance dependence. Hospitals with EHRs could develop electronic systems for automatically ordering tobacco treatment and/or include tobacco treatment on any HIV-related order sets.

Patients admitted with tobacco-related diagnoses were more likely than other admissions to be referred to our services. Smoking cessation helps promote recovery from a variety of illnesses and from surgery³⁰ and extends life regardless of age.³¹ Moreover, compared to people without HIV, patients with HIV may be more susceptible to the effects of tobacco use.³² Persons living with HIV have complex social, economic, psychiatric, and medical needs that might reduce treatment uptake and attenuate response to treatment.⁷ It is therefore extremely important to pursue cessation with all patients with HIV who smoke, and to continue to update cessation treatment methods as new therapies emerge.

Our finding that few patients used cessation medication in the hospital or postdischarge suggests a major barrier to cessation because use of nicotine replacement therapy (NRT) in the hospital predicts NRT utilization postdischarge, and use of cessation medications double or triple quit rates.³³

To remove the bias of referring only certain patients to tobacco treatment, hospitals could use EHR systems and standards already in place to prompt routine referrals of patients with HIV to tobacco treatment services. Tailoring the existing system and standards can help to provide comprehensive care to hospitalized smokers with HIV, thus improving their quality of care and quality of life.

Finally, even though one third of patients were referred to the quitline at six months, none of them reported using it. Given that quitlines are nationally available and offer free cessation services, this is a missed opportunity. Hospitals could consider enrolling patients in interactive voice response service follow-up to offer tobacco treatment on a periodic basis post-discharge³⁴ or performing a “warm handoff” in the hospital to link smokers with quitlines prior to discharge.³⁵ The high interest in quitting (8.1/10), paired with a low confidence in the ability to quit (5.9/10) speaks to the need for supportive services such as in-hospital support or the state tobacco quitline to help bridge the gap between desire to quit and ability to do so.

Limitations

Former smokers may have been included in the analyses, as we included any patient who reported smoking in the past 12 months. Few patients actually received tobacco treatment, and most were not reached for follow-up, so that reported treatment outcomes may not represent the true effects of the UKanQuit program on a populationwide basis. The low follow-up rate severely limits the generalizability of study findings. Moreover, because this study has no control group it is possible that outcomes at 6 months are due to other causes. The study hospital has a bedside tobacco treatment service, which may limit generalizability of the findings to hospitals with similar services. Furthermore, this was a single setting study, so the population and results may not be representative of other hospitals.

Conclusions

Hospitalization could be an important teachable moment for those with HIV to initiate smoking cessation. As HIV evolves into a chronic disease, the high prevalence of smoking will escalate tobacco use to a top cause of death among people living with HIV.¹⁰ Designating tobacco treatment a core quality measure for HIV treatment seems warranted.

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Flowchart of Admitted Patients with HIV, September 1, 2007–August 31, 2012

Figure 1.

The flowchart illustrates the status of patients with HIV from admission through referral to and follow-up to UKQ (UKanQuit, the University of Kansas Hospital Patient Tobacco Cessation Program).

Differences in Referral and Treatment Between All Smokers and Smokers with HIV

Figure 2.

As shown in the figure, of all smokers, 29.8% were referred to UKanQuit, while only 21.7% of smokers with HIV were referred ($p < 0.01$). Of all smokers, 24.7% were treated by UKanQuit, while only 18.7% of smokers with HIV were treated ($p = 0.04$).

Table 1

Demographics, Smoking Characteristics, and Treatment Provided to 43 Smokers with HIV Seen by UKanQuit Service, September 1, 2007–August 31, 2012 *

Characteristics	Treated (N = 43)
Demographics	
Mean age (SD), years	44.2 (10.39)
Male, <i>n</i> (%)	32 (74.4)
Ethnicity, non-Hispanic, <i>n</i> (%)	41 (95.3)
Race, <i>n</i> (%)	
White	29 (67.4)
African American	10 (23.3)
Other	4 (9.3)
Referral Source, <i>n</i> (%)	
Nursing profile	32 (74.4)
Physician order	3 (7.0)
Other	8 (18.6)
Substance abuse indicated, <i>n</i> (%)	38 (88.4)
Mean length of stay (SD), days	5.2 (4.93)
Tobacco-Related Discharge Diagnosis, <i>n</i> (%)	11 (25.6)
Smoking Characteristics	
Mean no. of years smoked (SD)	24.8 (11.77)
Smokes within 5 minutes of waking, <i>n</i> (%)	27 (69.2)
Mean cigarettes smoked per day (SD)	13.4 (10.25)
Mean interest in quitting (SD) *	7.5 (3.32)
Mean craving (SD) †	1.1 (1.60)
Tobacco Treatment Provided	
Counseling	
Average time spent with patients, min (SD)	12.6 (7.29)
Received information packet, <i>n</i> (%)	39 (92.9)
Set quit date, <i>n</i> (%)	8 (18.6)
Made quit plan, <i>n</i> (%)	18 (41.9)
Accepted fax referral to quitline, <i>n</i> (%)	13 (32.5)
Medication	
On smoking cessation medication, <i>n</i> (%)	7 (17.1)
Interested in receiving or changing quit-smoking medication, <i>n</i> (%)	5 (12.5)

Characteristics	Treated (<i>N</i> = 43)
Added/changed quit-smoking medication, <i>n</i> (%)	8 (20.5)
Requested postdischarge quit-smoking med, <i>n</i> (%)	4 (10.3)
Six-Month Follow-Up (<i>n</i> = 14)	
Smoking characteristics	
7-day point prevalence abstinence rate, <i>n</i> (%)	3 (21.4)
No. of smokers who attempted to quit within 6 months, <i>n</i> (%)	11 (78.6)
Used quit-smoking medication, <i>n</i> (%)	5 (35.7)
Importance/Confidence [‡]	
How important is it to quit/stay quit?, mean (SD)	8.1 (3.21)
How confident are you to quit/stay quit?, mean (SD)	5.9 (3.35)

SD, standard deviation; med, medication.

* For each variable, subsamples were slightly different from the total sample because of missing data, which were not included in the analysis.

[†] Craving ranges from 0 to 4.

[‡] Interest in quitting and confidence range from 0 to 10